

REMARKS

Paragraphs [0003], [0017], [0019], and [0022] have been amended by this Response. Claims 1-21 remain pending in this application. Claims 1 and 3 have been amended, and Claims 5-21 have been added by this Response. No claims have been cancelled by this Response.

Amendments to the Specification

Paragraphs [0003], [0017], [0019], and [0022] have been amended by these amendments to correct minor typographical errors. No new matter has been added by these amendments.

First, paragraphs [0003] and [0019] were amended to correct obvious typographical errors. The amendment to paragraph [0003] corrected “thee” to “the.” The amendment to paragraph [0019] corrected “contract” to “contrast.”

Next, paragraph [0017] was amended to correct a typographical error that should have stated “ $PC = stdDevConf$ ” (instead of “ $PC = pelDevConf$ ”) in the description of the logic for calculating an image profile confidence level. Following the logic, it is easily understood that this is what was originally intended by the Applicants because there is no previous mention of the term “ $pelDevConf$ ” in the logic description, and because the term “ $stdDevConf$ ” is one of the variables in the related “if” logical operation.

Finally, paragraph [0022] was amended to correct a typographical error that should have stated “ $FC = FC * (1.0 - BC/TC)$ ” (instead of “ $FC - FC * (1.0 - BC/TC)$ ”) in the mathematical depiction of the broken character considerations for the field confidence level. It is clear to one of ordinary skill in the art from the accompanying description in paragraph [0022] that the description was intended to be an equation, whereby the greater number of broken characters (“BC”) would result in a lower field confidence level (“FC”), which is made true by the present amendment.

Rejections of Claims 1-2 under 35 U.S.C. § 103(a)

In the first Office Action, the Examiner rejected Claims 1-2 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,754,674 to Ott et al. ("Ott") in view of U.S. Patent No. 6,363,162 B2 to Moed et al. ("Moed") and further in view of U.S. Patent No. 5,687,250 to Curley et al. ("Curley"). As related to Claims 1-2, the Examiner alleges that, among other features, the combination of references discloses calculating a confidence level for the predefined portions, calculating a text confidence level, calculating an image profile confidence level, creating an overall image confidence level, and comparing the calculated image confidence level to a threshold level. The Applicants respectfully assert that each of these features, as hereby amended, is neither disclosed, nor taught by Ott, Moed, Curley, individually or in any combination.

Ott generally discloses a method for capturing a document image at two sensitivity levels – a lower sensitivity level and a higher sensitivity level – and comparing the image elements of the lower sensitivity image capture to the image elements of the higher sensitivity image capture to determine if the lower sensitivity image capture is acceptable, based on a degree of conformity between the two. (*See* Ott, col. 2, line 58 to col. 3, line 12). More specifically, Ott discloses characterizing "objects," which are groups of black pixels that are connected to each other and comparing object characteristics between the corresponding low and high sensitivity image captures of the same document. (*See* Ott, col. 3, lines 36-42, 63-65, col. 4, lines 7-11, col. 7, lines 43-45). The parameters calculated for each object are specific to identifying the size and/or shape of the object (i.e., the size and/or the shape of the contiguous black pixels), such as comparing the height to the width, comparing the pixel count to the height times the width, and comparing the perimeter to the area. (*See* Ott, col. 8, lines 22-30). Ott only discloses comparing characteristics of an object captured at one sensitivity level to the same characteristic of that same object captured at another sensitivity level. The disclosures of the other references relied upon by the Examiner are discussed below as they specifically relate to certain features of the present application.

In contrast, the present application is generally directed to methods that determine confidence levels of portions of a scanned document image, whereby the determined confidence levels are then used for comparison to predetermined thresholds to determine if the scanned image is of an acceptable image quality. As a preliminary matter, the Applicants have amended Claim 1 to further clarify the confidence level determinations recited by the claims, and to further emphasize the distinctions over the cited art. More specifically, Claim 1 as amended hereby recites, among other features: “calculating an area confidence level for each of the predefined portions of the digital image as a function of a total number of black pixels located in the predefined portion relative to an expected number of black pixels for the predefined portion;” “calculating a text confidence level as a function of a total number of pixel groups relative to a total number of characters;” “calculating an image profile confidence level as a function of a black pixel distribution and a black pixel density;” and “calculating an overall image confidence level as a function of the area confidence level, the text confidence level, and the image profile confidence level . . . ;” and “storing the digital image as a result of determining that the overall image confidence level is greater than or equal to a threshold value”

The Applicants respectfully submit that Ott does not disclose any of the above described features recited in independent Claim 1. First, the Applicants respectfully disagree with the Examiner that Ott discloses an area confidence level. (See Office Action, pp. 2-3). Ott describes calculating “parameters regarding each *object* ... including length, width, perimeter, area density, and the ratio of the perimeter to the area.” (Ott, col. 3, lines 39-43 (emphasis added)). The “objects” for which parameters are being calculated are described as a “group of connected black pixels.” (Ott, col. 7, lines 43-44). To the extent “object” parameters are compared by Ott, (see, e.g., Ott, col. 8, line 31, “the object area ratio” cited by the Examiner), the comparison is to the same parameter calculation of the object performed on a higher sensitivity image scan.

In contrast, the area confidence level in Claim 1 of the present application is “a function of a total number of black pixels located *in the predefined portion* [e.g., the payee line text area] relative to an *expected* number black pixels for the predefined portion.” Thus, the “object” size and shape calculations, which may be compared to the a higher sensitivity image scan of the

same object, as described by Ott, are quite distinct from the area confidence level calculations recited in Claim 1, which include comparing “a total number of black pixels located in a predefined portion” and “an expected number of black pixels” in that area. Accordingly, for at least these reasons, Claim 1 is patentable over Ott alone and in combination with any of the other references cited.

Second, the Applicants respectfully assert that the step of “calculating a text confidence level” is clearly not disclosed or taught by Ott. The portion of Ott relied on by the Examiner is directed to calculating shape parameters that characterize the shape, size, and proportion of the “objects.” Further, as described above, the “object area ratio” calculation disclosed at column 8, lines 31 and 38 merely compares the area of the *object* (i.e., the number of black pixels in the object), (*see* Ott, col. 8, line 9), as scanned at a lower intensity to the area of the *same object* as scanned at a higher intensity.

Different from Ott, the step of “calculating a text confidence area” in Claim 1 includes comparing the “total number of pixel groups relative to a total number of characters.” A pixel group is a group of touching pixels. (Specification, para. [0014]). Each character is made up of one or more pixel groups. (Specification, para. [0014]). Thus, comparing the “total number of pixel groups” to the “total number of characters,” as recited in Claim 1, is clearly different than comparing “object” size and shape calculations in the image captured at varying levels of sensitivity, and, therefore, not taught by Ott. Accordingly, the Applicants respectfully state that in addition to at least the other reasons stated herein, Claim 1 is patentable over Ott alone, and in combination with the other cited references, because Ott does not disclose nor teach the step of “calculating a text confidence level.”

Third, the Applicants respectfully assert that the step of “calculating an image profile confidence level” of Claim 1 is not disclosed by Ott in combination with Moed, as stated by the Examiner. Taken alone, or in combination, Ott and Moed fail to disclose or teach determining “a black pixel density,” as is a part of the function used to calculate the “image profile confidence level.” More specifically, the black pixel density, as recited in Claim 1, is calculated by dividing

the total number of black pixels in an area by the total number of pixels (black or white) in the same area. (Specification, para. [0017]).

However, the portion of Ott relied upon by the Examiner for disclosing a black pixel density merely states that the “object” measurements performed in Ott measure the black pixels, referring to simple geometric measurements, such as an X-Y coordinate, the height, the width, the area, and the pixel count in the perimeter of the “object.” (*See* Ott, col. 8, lines 4-19, 20-21). Furthermore, even where Ott does refer to a “density,” (an “object density ratio”) the measurement described is specific to each object, dividing the area (i.e., the total number of black pixels in the “object”) by the height of the object times the width of the object. (*See* Ott, at col. 8, line 29). This “density,” as disclosed in Ott, is tied to and limited to the object dimensions, and clearly distinct from the density recited in Claim 1 of the present application. Additionally, the Examiner’s blanket statement that “[i]t would have been obvious to someone of the ordinary skill in the art ... to use Moed’s standard deviation ... in Ott’s verification of digital image quality in order to improve the system ...” does not provide a complete showing of obviousness over the step of “calculating an image profile confidence level” because it fails to account for considering the “black pixel density.” Accordingly, because “a black pixel density” is not disclosed or taught, neither Ott nor Moed, alone or in combination, teach the step of “calculating a image profile confidence level.

Additionally, the Applicants respectfully submit that because Ott, alone and in combination with the other cited references, fails to disclose each of the above-discussed confidence level calculations, “an overall image confidence level,” which is a function of “the area confidence level, the text confidence level, and the image profile confidence level,” is necessarily not disclosed or taught by the cited references.

Finally, with respect to Claim 1, combining Ott and Moed with Curley also fails to teach the amended step of “storing the digital image as a result of determining that the overall image confidence level is greater than or equal to a threshold value associated with the document type of the image,” at least for the reason that each of the confidence level calculations that make up

the overall image confidence level are not disclosed nor taught by the cited references, as discussed above.

Additionally, the Applicants respectfully state that Claim 2 is allowable as a matter of law, depending from an allowable claim, notwithstanding its independent recitation of patentable features.

Rejections of Claims 3-4 under 35 U.S.C. § 103(a)

The Examiner also rejected Claims 3-4 under 35 U.S.C. § 103(a) as being unpatentable over Ott in view of Moed and further in view of Curley and further in view of U.S. Patent No. 5,754,671 to Higgins et al. ("Higgins"). As related to Claims 3-4, the Examiner alleges that, among other features, the combination of references discloses calculating an image profile confidence level, calculating and adjusting a field confidence level, comparing broken characters to the total number of characters, calculating a line area confidence level, and comparing the overall document confidence level to a threshold level. (Office Action, p. 2-4). The Applicants respectfully assert that each of these features, as hereby amended, is neither disclosed, nor taught in Ott, Moed, Curley, Higgins, nor in any combination thereof.

The Applicants have amended independent Claim 3 to further clarify the steps recited therein, and to further illuminate the distinctions between Claim 3 and Ott, Moed, Curley, Higgins. More specifically, Claim 3 as presently amended recites, among other features: "calculating an image profile confidence level as a function of a black pixel distribution and a black pixel density;" "calculating a [] field confidence level as a function of the image profile confidence level, a character mass, broken characters, and a line area confidence level . . . ;" "setting an overall image confidence level to the minimum of the [] field confidence levels;" and "storing the digital image as a result of determining the overall image confidence level is greater than or equal to a threshold value"

First, for the same reasons as described above, neither Ott, Moed, Curley, nor any combination thereof, disclose or teach the step of "calculating an image profile confidence level," or the step of "storing the digital image based on a comparison of the overall image confidence

level to a threshold value,” as recited in Claim 3. Accordingly, notwithstanding the additional reasons discussed below, the Applicants respectfully assert that for at least these reasons, Claim 3 is patentable over the cited references.

Additionally, the Applicants submit that the cited references fail to disclose or teach “calculating a [] field confidence level” as recited by amended Claim 3. More specifically, because each of the individual qualities factoring into the field confidence levels – “the image profile confidence level, a character mass, broken characters, and a line area confidence level” – are not taught, as further described below, the “field confidence levels” are inherently not disclosed or taught.

First, nothing in Ott nor Moed discloses or teaches considering the “character mass” when calculating a confidence level. The portion of Moed to which the Examiner cites discusses filtering out background patterns in a signature line of an image, by reviewing the number of other black pixels connected to each black pixel within the region of interest, by reviewing the black pixel distribution within one or more rows, and by removing the black pixels if they fall under a certain threshold of number of connected pixels and/or deviation from the mean number of black pixels. (*See* Moed, col. 7, line 56 to col. 8, line 9, and col. 11, line 55 to col. 12, line 9).

In contrast, the “character mass” recited in Claim 3 of the present application represents the number of black pixels in each character in a certain area, (*see* Specification, para. [0021]), which is clearly quite distinct from both the number of connected pixels to each pixel and the distribution of black pixels within a row, as taught by Moed. Accordingly, the Applicants respectfully assert that Ott in combination with Moed does not disclose or teach “calculating a [] field confidence level” recited in Claim 3.

Next, the Applicants respectfully submit that considering the number of “broken characters” as a factor of the field confidence level is also not taught by Moed, because Moed does not teach “broken characters” as used in Claim 3 of the present application. Moed identifies broken characters as the deviation from the mean of the number of connected components compared to the number of pixels per connected component, and assigns an image quality rating

depending upon the deviation and reasons for the deviation. The term “broken characters,” as used in Claim 3, are characters having more than one pixel group. (See Specification, para. [0022]). Thus, comparing standard deviations and distributions of connected components is quite different from identifying broken characters as being made up of more than one pixel group. Accordingly, the Applicants assert that Ott in combination with Moed fails to teach adjusting the field confidence level based at least in part on the number of “broken characters,” and that Claim 3 is therefore patentable over Ott and Moed.

The Applicants also respectfully submit that “a line area confidence level,” as is recited in Claim 3, is neither disclosed nor taught by Ott, alone or in combination with the other cited references. The Examiner relies on a portion of Ott that describes calculating a “perimeter to area ratio,” which is “the total number of *boundary* pixels divided by the total number of pixels in an object.” (Ott, col. 9, lines 23-26 (emphasis added)). However, the “line area confidence level” recited in Claim 3 includes a comparison of the number of black pixels in characters to an *expected* number of pixels. (See Specification, para. [0023]). Thus, the “perimeter to area ratio” calculations of Ott are clearly different than the “line area confidence level” calculations of Claim 3. Accordingly, because Ott, alone and in combination with the other cited references, also fails to disclose or teach “line area confidence level” calculations, the Applicants respectfully state that Claim 3 is patentable over the cited references.

Finally, the Applicants respectfully state that because Ott, Moed, Curley, and any combination thereof, fail to disclose calculating each the above-discussed confidence levels for at least those reasons, which in turn are used to adjust the field confidence level, the cited references necessarily fail to disclose or teach “setting an overall image confidence level to the minimum of the [] confidence levels.” Furthermore, where the Examiner relies on Higgins for teaching this feature, the Applicants respectfully disagree. Higgins merely relies on confidence levels to determine whether there is satisfactory correlation between words during word recognition techniques. (See Higgins, col. 12, lines 21-27). The teachings of Higgins in no way suggest “setting an overall image confidence level to the minimum of [multiple] confidence levels” previously calculated. Accordingly, the Applicants assert that Higgins fails to disclose or

teach the step of “setting the overall image confidence level to the minimum of the [] field confidence levels,” and for at least this additional reason, Claim 3 is patentable over the cited references.

Additionally, the Applicants respectfully state that Claim 4 is allowable as a matter of law, depending from an allowable claim, notwithstanding its independent recitation of patentable features.

Thus, for at least the reasons discussed above, the Applicants respectfully state that neither Ott, Moed, Curley, nor Higgins, nor any combination thereof, disclose, teach, or suggest every limitation of independent Claims 1 and 3. Furthermore, the Applicants respectfully state that dependent Claims 2 and 4 are patentable as a matter of law, depending from Claims 1 and 3, respectively, and also in condition for allowance. Therefore, independent Claims 1 and 3, and dependent Claims 2 and 4, are nonobvious and patentable over the references cited by the Examiner, and are in condition for allowance.

New claims allowable over the cited references

By this Amendment and Response, the Applicants have added new dependent Claims 5-17, 19, and 21, and new independent Claims 18 and 20. The Applicants state that no new matter is added by these new claims, that support can be found in the Specification, and that these claims are patentable over the cited references.

Claims 5 and 6 add the additional steps of handling a second digital image when the overall image confidence level of the first digital image is less than the threshold value. Specifically, Claim 5 includes the additional steps of “determining that the overall image confidence level is less than the threshold value; receiving a second digital image of the document; replacing the first digital image with the second digital image, wherein the second digital image is treated as the digital image; and repeating steps (b) through (f) [of Claim 1].” Claim 6, depending from Claim 5, further defines what the second digital image may result from. Claims 11 and 12, depending from Claim 3, add similar steps to those in Claims 5 and 6. The

additional steps of handling a second image is not taught in any of the cited references and, therefore, Claims 5-6 and 11-12 are patentable over these references. Support for Claims 5-6 and 11-12 can be found at least at paragraphs [0019] and [0025] of the Specification, respectively.

Claim 7, depending from Claim 1, adds additional processing steps for calculating the area confidence level. Claim 8, also depending from Claim 1, adds additional processing steps for calculating the text confidence level. Claims 9-10 also add additional processing steps for calculating the image profile confidence level, including, for example, calculating a standard deviation and calculating the black pixel density, as well as adjusting the standard deviation and the black pixel density based on maximum and minimum allowable values. Claim 11, also depending from Claim 1, adds further processing steps for calculating the overall image confidence level. Notwithstanding the additional patentable features added by these new claims, because the features to which these claims relate are not taught in the cited references, each of Claims 7-11 is patentable over the references cited by the Examiner. Support for new Claims 7, 8, 9-10, and 11 can be found at least at paragraphs [0012]-[0013], [0015], [0017], and [0018] of the Specification, respectively.

Furthermore, new Claims 14-15, depending from Claim 3, add steps similar to Claims 9-10, such as, for example, calculating a standard deviation and calculating the black pixel density, as well as adjusting the standard deviation and the black pixel density based on maximum and minimum allowable values. Support for Claims 14-15 can be found at least at paragraphs [0021] and [0017] of the Specification.

Claims 16 and 17, also depending from Claim 3, add additional processing steps for calculating the respective field confidence levels, including, for example, additional character mass calculations, additional broken character considerations, and additional line area confidence calculations. None of these additional steps are disclosed or taught by the references cited by the Examiner, and are therefore patentable over these references. Furthermore, the features to which these claims relate are not taught by the cited references, providing another reason for

patentability. Support for Claims 16 and 17 can be found at least at paragraphs [0021]-[0023] of the Specification.

Independent Claims 18 and 20, and dependent Claims 19 and 21, add processing steps for processing a second digital image if the overall area confidence level of a first digital image is less than the threshold, similar to those captured in Claims 5 and 11, and 6 and 12, respectively. Independent Claim 18 includes the steps of: “calculating an area confidence level for each of the predefined portions of the second digital image . . . ;” “calculating a text confidence level . . . ;” “calculating an image profile confidence . . . ;” and “calculating a second overall image confidence level” Dependent Claim 19, like that in Claim 6, further defines what the second digital image may result from. Accordingly, for the same reasons that each of these steps is not taught by the cited references as discussed above for Claim 1, Claim 18 is likewise patentable over the cited references, individually or in combination. Claim 19 is patentable, as a matter of law depending from Claim 18. Support for Claims 18 and 19 can be found in at least paragraphs [0019] and FIG. 1 of the Specification.

Similarly, independent Claim 20 and dependent Claim 21 add similar processing steps to Claims 11 and 12 – subsequent processing of a second digital image if overall image confidence level is less than the threshold level for the first digital image. Independent Claim 20 includes the steps of: “calculating an image profile confidence level . . . ;” “calculating a [] field confidence level as a function of the image profile confidence level, a character mass, broken characters, and a line area confidence level . . . ;” and “setting a second overall image confidence level to the minimum of the [] field confidence levels” Dependent Claim 21, like that in Claim 12, further defines what the second digital image may result from. Accordingly, for the same reasons that each of these steps is not taught by the cited references as discussed above for Claim 3, Claim 20 is likewise patentable over the cited references, individually or in combination. Claim 21 is patentable, as a matter of law depending from Claim 20. Support for Claims 20 and 21 can be found in at least paragraphs [0025] and FIG. 2 of the Specification.

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Accordingly, the Applicants respectfully state that new Claims 5-21 do not add new matter, are fully supported by the Specification, and are patentable over the cited references.

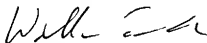
In conclusion, the Applicants respectfully request the Examiner's full consideration of these amendments and remarks, and request allowance of Claims 1-21, presented herein.

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CONCLUSION

Reconsideration of the application is requested in light of the amended claims, specification, and the remarks. The Applicants believe they have responded to each matter raised by the Examiner. Allowance of the claims is respectfully solicited. It is not believed that extensions of time or additional fees are required beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. §1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 19-5029.

Respectfully submitted,



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9-12-07

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